



CHAPTER 9.0 IMPLEMENTATION PLAN

House Bill (HB) 108 requires the UDOT to report to the legislature the costs and implementation timeline estimates for the proposed improvements identified in the Suggested System Alternative. The implementation plan is a key part of this requirement, providing insight into both improvement costs and timeline estimates as part of a broader implementation plan that incorporates nearly all of the study's long-term findings and recommendations.

9.1 IMPLEMENTATION PLAN OVERVIEW

The implementation plan incorporates all of the proposed improvements associated with the Suggested System Alternative and proposes a schedule and yearly budget (based on the cost estimates developed for the individual improvements) for implementing those projects. This implementation plan is based on a number of considerations:

- Cost benefit analysis.
- Budget normalization.
- The *Wasatch Front Regional Transportation Plan: 2007-2030 (2030 RTP)* sequencing and opportunities to coordinate the new projects with work that is already considered as part of the current 2030 RTP.
- Current 2030 RTP costs.
- Various stakeholder priorities.
- Anticipated need for the proposed facilities.
- Anticipated availability of precedent infrastructure and development.

The implementation plan addresses all of these considerations and presents a logical schedule for project implementation based on those considerations. The implementation plan also includes the proposed schedule and costs, as well as the benefit associated with reduced travel time costs, in both graphical and tabular formats.

9.1.1 Technical Data and Assumptions

During the development of the implementation plan, the following technical data sets and assumptions were used:

- The Suggested System Alternative and interrelated proposed improvements.



- To define a base user travel time cost, the 2005 and 2030 Beyond (scenario based on 2030 RTP model network and a forecasted 2030 beyond socioeconomic data set) model travel times were used to define the start (2005) and end (possibly 2040) travel times for the implementation timeline. The intermediate year travel time estimates were calculated by direct linear interpolation. For the purposes of this plan, the 2030 Beyond date was defined as 2040.
- The Suggested System Alternative travel time cost was derived as just described by using the 2005 and the Suggested System Alternative model.
- An inflation rate of 3 percent was applied to dollar amounts beyond the base year for inflation of 2008 costs.
- The 2008 user cost, for purposes of calculating delay and delay reduction (user benefit), was \$16.89 per hour. This hourly rate was derived from the average salary reported in the June 2008 *Utah Economic Summary* prepared by the Governor's Office of Planning and Budget.
- Travel time costs and reduction were calculated using daily values and factored by 260 (days) to derive annual values for the five-day work week.
- Project costs only include right-of-way and construction costs. No design or study costs were included in the estimates.
- The benefit, or travel time cost reduction, was calculated for each improvement as a system. This means that the benefit shown for one proposed improvement assumes that all the other proposed system improvements exist.

9.1.2 Considerations and Approach

While evaluating the data that supports the implementation plan, it was necessary to consider and approach the calculations in a way that allowed meaningful and consistent comparison of individual projects within the Suggested System Alternative. While these considerations and approach do not fully represent the reality of implementing the proposed projects, they do allow a uniform comparison of the proposed improvements while providing a reasonable estimate of the total costs and timeline expectations in order to derive implementation budgets.

To clarify the limitations of the proposed implementation plan, the following critical considerations of this plan and approach were made:

- Estimated 2030 RTP costs are included for reference and comparison in the implementation plan. Only costs for the 2030 RTP projects within the study



boundary were considered. These costs were then divided into three phases of improvements per the 2030 RTP. For the purposes of this effort, the cost of each phase was then evenly distributed for each year of the phase in order to produce an average yearly cost across the entire 2030 RTP timeline.

- The 2030 Beyond scenario includes only the transportation system improvements that are proposed as part of the 2030 RTP.
- To simplify cost distribution, total project costs for the Suggested System Alternative improvements were evenly distributed across each of the proposed project timelines without regard to that likelihood that these costs would be unequally distributed throughout the project timeline during study, design, and construction. Consequently, the distribution of project costs throughout the life of each project does not mirror a typical design or construction cost distribution. This was done to allow more flexibility in changing or modifying the implementation plan during the development process.
- Projects that would require significant right-of-way acquisition were typically given longer project timelines. This assumption was made to allow a longer project timeline for projects with significant right-of-way costs so that right-of-way could be acquired in advance of project construction, thus reducing long-term land acquisition costs.
- Some projects were not assigned a benefit because no current facility exists for comparison and/or calculation of user delay reduction. The projects without a calculated benefit were all of the transit improvements and the half diamond interchange at I-215 and 5400 South.
- 2030 RTP projects that would either be replaced or modified by the Suggested System Alternative improvements would likely reduce the costs either for the 2030 RTP or for the proposed study improvements.
- Travel times in the 2005 model were assigned to all corridor links with proposed corridor improvements represented within the geographic study area of the 2030 model, regardless of whether those links existed in 2005 or not. The travel time assigned to these links was equal to the average travel time reported for the adjacent links within a mile of that corridor in the 2005 model. This assumption allowed a more meaningful delay reduction calculation for existing facilities that do not currently extend to their proposed geographic limits for the 2030 Beyond scenarios (2030 Beyond and Suggested System Alternative).



- The annual user volume calculated for any given facility was a direct linear interpolation between the 2005 model volume and either the 2030 Beyond model facility volume or the Suggested System Alternative facility volume.
- User benefit was determined to represent the user travel time cost reduction and was defined as the reduction in per user travel time from the two scenarios considered and compared for this plan: the 2005 to 2030 Beyond scenario and the 2005 to Suggested System Alternative scenario. This travel time reduction was then multiplied by the annual user volume for the facility and then multiplied by the user travel time cost. This calculation method was used to mitigate the effects of increased volume on facilities due to the improvements that created higher costs than the base scenarios, mainly due to much larger traffic volumes being multiplied by a travel time and cost.
- User travel time cost reduction begins accruing in the year after project completion but does not occur in any of the years during or prior to project implementation.
- User delay, as a function of construction, was not considered in the analysis.

9.1.3 Project Prioritization and Schedule

The order of project implementation was prioritized within the Suggested System Alternative using total project cost analysis, total user benefit analysis, considerations for the current 2030 RTP phasing, and input from Stakeholder Working Group (SWG). The goal of this prioritization activity was to evenly distribute the proposed implementation costs while maximizing total user benefit, considering SWG priorities and coordinating the phasing of the proposed projects with the current 2030 RTP projects where appropriate.

Prioritization of projects within the timeline began with a cost/benefit analysis that generally assigned the highest priority to projects that provided the greatest total benefit and the lowest total cost. The transit facilities, half-diamond interchange at 5400 South, and 7000/7800 South reversible lanes improvements were difficult to assign a benefit and were assigned initial priority based on the timeframe of anticipated need and the prior implementation of 2030 RTP improvements. Priority assignments were also adjusted based on the need to coordinate some projects with the phasing of current 2030 RTP projects. Projects that expanded or further improved corridors that were already considered by the current 2030 RTP were generally phased to coincide with the 2030 RTP improvements.

Feedback from the SWG validated the priorities/schedule and was used to make final modifications, where appropriate, based on cost-benefit analysis and the 2030 RTP



considerations. Table 9-1 shows the primary details of the plan – the project, proposed start date, proposed project duration (including right-of-way procurement), project cost (considering the project start date and inflation cost increases), and travel time savings associated with the improvements.

Table 9-1. East-West Arterial Implementation Plan Proposal

	Project Description	Start	Schedule (yrs)	Cost ¹	Travel Time Savings ¹
N1	SR 201 widening	2021	7	\$3,642	\$612
N3b	3100 South reversible lane	2009	2	\$44	\$206
N4	BRT/LRT-3500 South extended from 7200 West	2022	3	\$41	-
N6a	BRT/LRT-5400 South extended from Bangerter	2025	3	\$61	-
N7a	6200 South widening	2014	6	\$407	\$676
N8	I-215 half-diamond interchange at 5400 South	2011	2	\$117	-
N11a	4100 South convert to expressway	2010	5	\$758	\$453
N14	I-215 upgrade	2017	4	\$771	\$1,032
C1b	9000 South freeway conversion 6 lanes	2015	5	\$2,903	\$698
C2c	7000/7800 South reversible lanes	2010	2	\$40	-
C4	Mid-Jordan Line LRT Extension to Kennecott	2038	2	\$446	-
C5	9800 South widening	2009	2	\$127	\$406
C7	10400 South widening	2021	4	\$241	\$110
C8	11400 South widening	2022	2	\$79	\$68
S4	13400 South widening	2030	1	\$99	\$53
S6	Redwood Road widening	2020	2	\$75	\$70
S7b	BRT-11400 South from Mid-Jordan line	2015	3	\$165	-
S8	BRT/LRT-Mid-Jordan extension	2031	10	\$1,329	-
A1a	Bangerter Highway freeway conversion	2009	7	\$767	\$5,237
A2b	Widen SR 111 to a 6 lane expressway	2028	10	\$3,568	\$478
A3	BRT-Redwood Road extended from 7800 South	2038	2	\$27	-
Total				\$15,708	\$9,004

¹Dollars in Millions

9.1.4 Interpreting the Graphs

Figure 9-1 illustrates the yearly cost to implement the Suggested System Alternative based on the implementation plan. The figure shows the Suggested System Alternative costs (costs in addition to the 2030 RTP costs) and includes the current 2030 RTP costs associated with the study area as distributed by the 2030 RTP phases. Lastly, a total cost is shown, which is the sum of the 2030 RTP costs and Suggested System Alternative costs in any given plan year.



Figure 9-1. Implementation Plan Cost

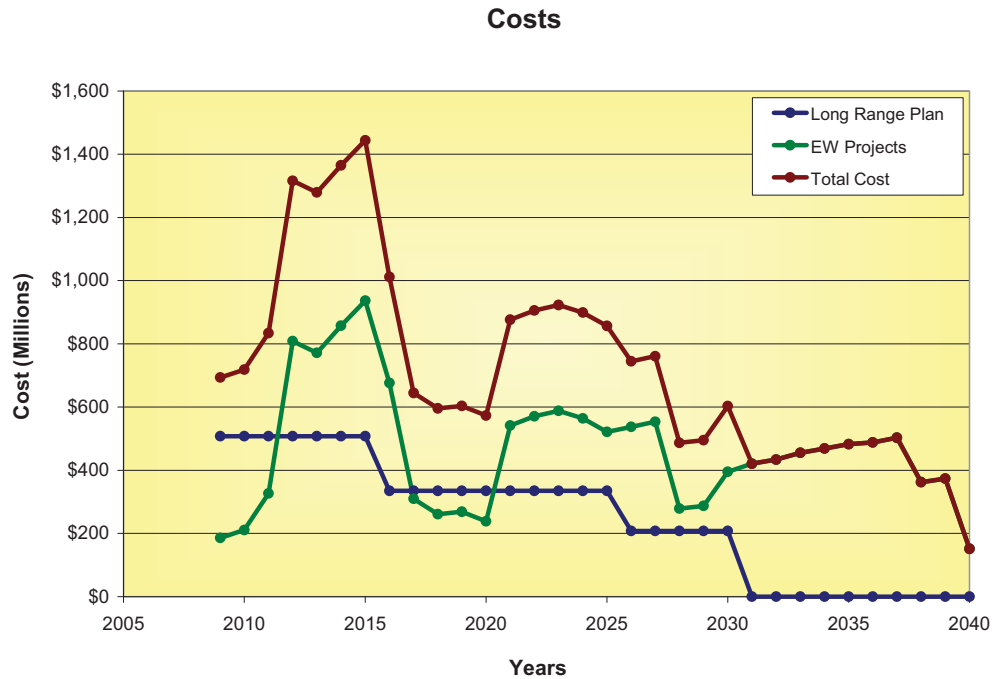
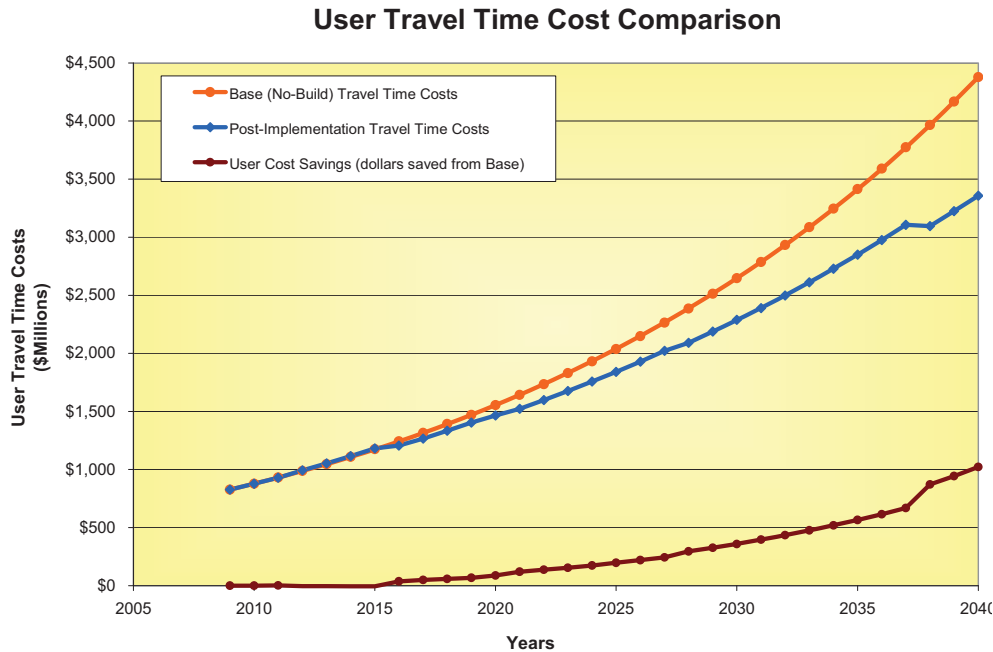


Figure 9-2 depicts the projected sum of all travel time costs from 2009 to 2040 for each of the facilities with proposed improvements in the Suggested System Alternative (excluding transit projects and the partial I-215 interchange at 5400 South). The Base (No-Build) Travel Time Costs show the base conditions – if nothing were done beyond the 2030 RTP improvements. The Post-implementation Travel Time Costs show the user cost with the proposed improvements of the Suggested System Alternative as phased in the implementation plan (order shown in Table 9-1). The last cost shown is the User Cost Savings with implementation of the proposed improvements.



Figure 9-2. Implementation Plan User Travel Time Cost Comparison



9.1.5 Conclusions and Recommendations

Table 9-1 itemizes the suggested improvements and the recommended implementation schedule as ordered in the table (order based on the implementation year). Based on the implementation plan as outlined, the proposed improvements will cost approximately \$15.7 billion, taking inflation into consideration. The 2030 RTP projects proposed for the study area are anticipated to cost about \$7.9 billion through 2030. The East-West Transportation Planning Study improvements, as implemented based on this plan, will save users approximately \$10 billion dollars over the timeline of the plan. This recommendation is based on several factors: the cost/benefit of each proposed project, the potential of integration and coordination with the 2030 RTP, and the even allocation of dollars over the timeline while maximizing potential user savings.

This implementation plan is adjustable and would reflect different yearly costs if the individual proposed improvements were allocated differently. This plan also makes certain assumptions, as previously discussed, to simplify the approach and complexity of the data used to develop this plan. However, this plan provides an estimate for costs to help budget and plan for the fiscal requirements necessary to implement the proposed improvements.